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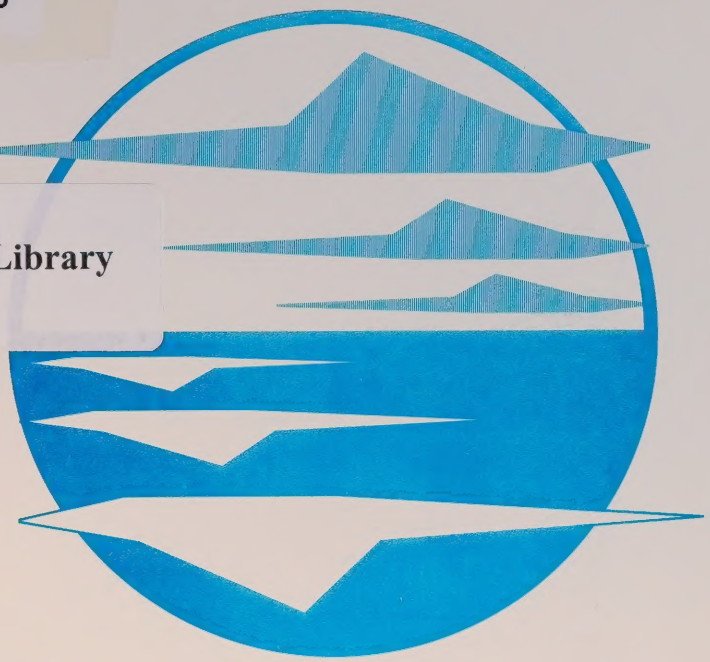

PROGRESS

1987/ 1989

REPORT

CONSERVATION AND PROTECTION
ENVIRONMENT CANADA

Environment Canada Conservation and Protection
Environnement Canada Conservation et Protection
Canada

HEALTH OF OUR OCEANS

THE MARINE ENVIRONMENTAL QUALITY ISSUE

PROGRESS REPORT

1987-89

November 1989

MEQ Advisory Group

Conservation and Protection

Environment Canada

"AN OCEAN IS FOREVER ASKING QUESTIONS

AND WRITING THEM ALOUD ALONG THE SHORE"

Edwin Arlington Robinson

American Poet of Landscape

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EXECUTIVE SUMMARY

This report covers two years of activity on the Marine Environmental Quality Issue of Conservation and Protection, Environment Canada. Progress on policy and planning, national issues and initiatives, and international activities are described.

A number of federal policy statements and documents have been released since 1986 with a direct bearing on the nature and progress of the MEQ Initiative in Environment Canada. These include: Oceans Forum (1986); Oceans Policy for Canada (1987); Guide to Federal Government Activities (1987); Canadian Arctic Marine Conservation Strategy Discussion Paper (1987); Conservation and Protection MEQ Management Framework (1987); and the Multi-Year Marine Science Plan (1988). Collectively, these clarify and strengthen the mandate of Environment Canada for the protection and conservation of Canada's seas, i.e. marine environmental quality.

Major national marine issues during this period included oil spills; contaminants from pulp and paper mills; contaminants in shellfish, fish and wildlife; harbour pollution; aquaculture-industry conflicts; persistent plastics at sea; ocean dumping; contaminants in native foods; marine pollution effects on human health; and threats to wildlife. Actions on these issues are described.

National MEQ initiatives included monitoring studies and reporting, starting the development of water and sediment guidelines, SOE reports, new and continued coastal management programs, applied research, various reports and papers, and conferences and workshops on key topics.

International activities pertaining to a number of Canada's obligations and commitments for the "global marine commons" are described.

Work on MEQ in Conservation and Protection continues, through ongoing operational research, regulatory and compliance programs, and initiatives of the new Five-year MEQ Action Plan. Such work, especially with the cooperation and involvement of other agencies and stakeholders, is becoming vitally important as multiple and often conflicting uses of our estuaries, coasts and offshore waters increase and intensify.

ACKNOWLEDGEMENTS

All Members of the MEQ Advisory Group and other staff of Conservation and Protection who contributed to this Report are thanked for their very valuable time and efforts.

NOTE

The MEQ Advisory Group would appreciate receiving comments on the Report from any of its readers. Please direct your comments to P.G. Wells (C&P, Atlantic Region), C. Kriz (C&P, HQ), or L. Harding (C&P, Pacific and Yukon Region).

1. INTRODUCTION

Environment Canada has been involved in marine environmental protection and conservation since its formation in 1971. There is a full range of mandated responsibilities and programs (DOE Marine Policy, 1988).

The Marine Environmental Quality (MEQ) issue, with its wide range of facets and topics, and its regional, national and international dimensions, was recognized by senior management in the period 1982 to 1985. Resources were allocated to it and DOE (Atlantic) and EPS (Atlantic) were assigned the lead responsibility to develop the issue. An MEQ Working Group was established for Conservation and Protection, and an interim Action Plan was approved by the ADM (C&P) in October 1985. Work by the MEQ Working Group has proceeded since 1985, with particular efforts on specific items in the MEQ Action Plan (conferences, workshops, communications, MEQ reports, marine water quality guidelines, monitoring needs, and priorities for marine research, assessment, control and monitoring). The overall goals of the MEQ Action Plan were to focus Service and Departmental concerns and responsibilities for marine environments so that programs and activities effectively prevent, eliminate and reduce the deleterious effects of pollutants in marine areas, and to increase Service and Departmental influence with relevant sectors and clients, so that national and international commitments to MEQ are met effectively.

A Marine Workshop was held by senior management in July 1987, at Qualicum, B.C. This Workshop reviewed and revitalized the Shellfish Program, giving approval to request increased resources which resulted in a Treasury Board submission for increased resources. Progress on the MEQ Issue was reviewed, with agreement reached on the MEQ Conference (for 1988), a revised MEQ Action Plan for Conservation and Protection, and the draft MEQ Management Framework. A DG's Steering Committee for the MEQ Issue was established at this workshop. C&P Management Board approved the MEQ Management Framework (Environment Canada 1987) in September 1987. The Management Framework has reconfirmed Environment Canada's commitment to the marine environment consistent with its many responsibilities. In support of delivering the requirements of the MEQ Management Framework, it was agreed by Management Board that the framework would be implemented under the direction of a steering committee (DG's, Director's, Policy), and that the MEQ Advisory Group would prepare a five-year Action Plan.

The Canadian Conference on Marine Environmental Quality was held February 29 - March 3, 1988, in Halifax. It focused on the UNEP Montreal Guidelines and its Marine Environmental Protection Framework, brought considerable publicity in Canada to the MEQ issue and specific marine problems, and produced a number of tangible conclusions and recommendations regarding protecting and conserving Canada's seas.

Conservation and Protection has a considerable number of regulatory responsibilities for MEQ (Cornwall et al., 1988). These have been enhanced by the Canadian Environmental Protection Act (CEPA, 1988), and by new perceptions of and urgency given to our national and international roles and responsibilities for the oceans. MEQ is incorporated into CEPA , not only

through Part VI, but also through the mandate for state of environment reporting, in assessment, in the development of environmental quality guidelines, objectives, regulations and codes of practice, and in enforcement and compliance.

The MEQ Action Plan for Conservation and Protection (Environment Canada, 1989) has been submitted for review and approval by the DG's Steering Committee. New actions are recommended for monitoring, guidelines, SOE reporting, management plans, communications and public awareness, and marine environmental research and development.

The Annual Report on Marine Environmental Quality for Conservation and Protection, henceforth due on August 1 of each year, is at the direction of the DG's Steering Committee. Its purpose is to describe highlights in the areas of policy, national issues and initiatives, and international activities and also to identify gaps in programs that can be addressed through the regular planning cycle, or through other mechanisms. This progress report covers the period 1987-1989.

2. POLICY AND PLANNING

A number of federal policy statements have been made in the past two years of direct relevance to the progress of the MEQ issue within Conservation and Protection.

Fisheries and Oceans (DFO, 1986) clearly stated at the 1986 Oceans Forum in Patricia Bay, B.C., that Environment Canada plays a major role in marine environmental protection, and also has an important role in the protection of living marine resources.

In 1987, Fisheries and Oceans tabled the Oceans Policy for Canada (DFO, 1987a) and Canada's Oceans: an Economic Overview and Guide to Federal Government Activities (DFO, 1987b). Canada is committed to "soundly managing and protecting ocean resources and the ocean environment for future generations of Canadians", and Environment Canada is recognized for its extensive role in marine environmental protection and conservation. Also, in 1987, Environment Canada released its Conservation and Protection MEQ Management Framework (Environment Canada, 1987), as described above.

In January 1988, DFO released the Canadian Arctic Marine Conservation Strategy discussion paper (DFO, 1987c), proposing a strategy and framework "for the conservation and management of Arctic marine resources and outlining ten principles and six strategies". The fourth strategy is Arctic MEQ, to "maintain, protect and enhance the quality of the Arctic marine environment to ensure the well-being of marine life and human populations". The strategy states that DFO will lead in the development of MEQ criteria (i.e. environmental quality guidelines) for the Arctic marine area.

Stimulated by the Brundtland Report (WCED, 1987), the Report of the National Task Force on Environment and Economy (CCME, September 1987, see Lecuyer and Aitken, 1987) made important recommendations pertaining to conservation strategies, international responsibilities, and communications and education that can be used for enhancing the quality of our oceans and the global seas.

In March 1988, the Supreme Court of Canada reached the decision that the federal government has the right to control ocean pollution even if it occurs inside a province. The decision stated that "marine pollution ... is clearly a matter of concern to Canada as a whole" and that the Constitution gives the federal government the right to control ocean pollution.

The federal Multi-Year Marine Science Plan was completed in 1988 (DFO, 1988). Marine environmental quality was identified as a strategic issue in Canadian marine science, and a recommendation was made to set up an MEQ Sub-committee of the Interdepartmental Committee on Oceans with an agenda to review the recommendations and conclusions of the Canadian MEQ Conference and to develop a National MEQ Framework and Action Plan. This initiative is now underway.

Environment Canada completed a policy statement "A Framework for Environment Canada's Responsibilities in the Marine Environment" in 1988 (Environment Canada, 1988a). It was endorsed by the Executive Management Committee in

November 1988, with recommendations that a senior marine inter-service committee be established, a marketing strategy for DOE's marine programs be developed and implemented, and an annual Marine Report be prepared for the department.

The Science Council of Canada recently released several discussion papers focusing on water-related issues (Science Council of Canada, 1988a, b; Côté, 1989). The Water 2000 Report (Science Council of Canada, 1988a) identifies serious, unresolved research issues on water, such as the relations between fresh water and the marine environment, and the fate and impacts of low levels of toxic chemicals. The report "The Many Dimensions of Marine Environmental Quality" (Côté, 1989) identifies information needs and science policy questions that must be addressed in order to take a holistic approach to marine protection and management. Finally, "Environmental Peacekeepers" (SCC, 1988b) recommends that CCREM (now CCME) address the scientific resource and infrastructure needs to enable rigorous evaluations of the quality of ecosystems, including marine. "Into the Mainstream" (DOE, 1988b) identifies the main action areas for environmental management, namely clean-up, conservation, prevention and adaptation/anticipation, all of which are well-recognized needs for solving the problems facing Canada's seas.

3. NATIONAL ISSUES

Conservation and Protection is actively involved in a number of national MEQ Issues through response, research, assessments, clean-up and control, monitoring and prevention. Highlights of some of these are described below.

3.1 OIL

A number of spills have occurred recently in Canadian and international waters. These have heightened awareness of the oil spill threat to marine resources and habitats on all coasts of Canada, and to our relatively limited capabilities to combat and contain the environmental damage of most spills.

Two moderately-sized spills occurred in Placentia Bay, Newfoundland. A 500 barrel crude oil spill at the Come-By-Chance Refinery affected beaches up to 25 km away, and a ship discharge at the refinery killed 1500-2000 seabirds and oiled beaches. There were a number of other illegal discharges of oil in 1988-89 that killed seabirds. This is a growing problem in southern Newfoundland waters, as shown at the 1988 Workshop "Mitigation of Effects of Oil Pollution on Seabird Populations: Prevention and Prosecution in Newfoundland and Labrador Waters (Environment Canada, 1988c).

Assessment of the effects of the Nestucca Bunker C Spill off the coast of Washington in December 1988, which affected the west side of Vancouver Island, continues to be a major project for the Pacific and Yukon Region. The spill coated 150 km+ of shoreline, 2 to 3 km heavily; killed thousands of seabirds; contaminated fish habitats; and coated mammal colony sites. Oil continues to appear in small quantities on the beaches even after the extensive clean-up (Wykes et al., 1989). Appropriate fate and effects studies are underway to determine the distribution, persistence, composition and long term hazards of the remaining stranded oil. The incident showed that Canada is poorly prepared to mount a scientific response to oil spills designed to produce data for environmental litigation.

A major spill at the Ultramar facilities in the lower St. Lawrence, May 1988, involved EP and CWS in the clean-up, and led to a network of oiled-bird cleaning centres along the St. Lawrence River and Estuary.

The Exxon Valdez crude spill in Alaska, March 1989, following the above spills, led to Canadian advice and assistance with its clean-up, and a ministerial inquiry and public review on the state of Canada's preparedness to combat and cleanup spills in Canadian coastal and offshore seas. The Valdez spill greatly affected marine wildlife in Alaska, including migratory seabirds that frequent the B.C. coast during winter months.

Spills and blowouts of both oil and gas in offshore waters continue to be a major concern. The B.C. government has extended the ban on offshore exploration for ten years. In addition, the B.C. government with federal support is updating computerized inventories of sensitive coastal areas in a manner amenable to data input and analysis during emergency responses, and the

province has joined a regional (Alaska, B.C., Washington, Oregon, California) oil spill task force. An MOU for the provision of offshore environmental services (effects monitoring, meteorology, and emergencies) was signed in April 1989 by the Canada-Newfoundland Offshore Petroleum Board. Reports have been prepared on Point Source Effects Monitoring (Environment Canada, 1988d) and on issues and concerns pertaining to the shipping of oil and gas from the Eastern Arctic along the Labrador and Newfoundland coasts (Environment Canada, 1988e).

3.2 PULP AND PAPER EFFLUENTS

The impact of pulp and paper mill effluents on marine waters and their resources, on both coasts, is a major public and governmental concern.

Following discussions with Scandinavian scientists, extensive reports (Sprague and Colodey, 1989: Colodey, 1989) were produced on the known effects of bleached effluents in marine waters, and the implications to the Canadian environment. Information and conclusions are being incorporated into a national document for the regulation under CEPA of chlorinated organics in pulp mill effluents.

Crab, prawn and shrimp fisheries have been closed around three Pacific coast mills due to elevated levels of dioxins and furans. Monitoring programs of organochlorines in tissue and sediments are being established to describe the extent of contamination, adjust fishing closure boundaries, and follow environmental recovery after improved treatment of effluents and in-plant process changes.

Environmental effects monitoring guidelines (Pomeroy et al., 1989) are being produced to ensure that comparable monitoring program design and data for pulp and paper mill operations are produced on both coasts. This is the outcome of a joint HQ/Pacific Atlantic program of workshops and studies on EEM for pulp mills, involving industry and CEARC.

3.3 CONTAMINANTS IN SHELLFISH, FISH AND WILDLIFE

Shellfish

Commercial and non-commercial shellfish have proven to be an effective monitor of marine environmental quality in Canada's nearshore waters. Recently they have demonstrated the presence of anthropogenic materials and natural toxins in many locations.

The areas closed to shellfish harvesting due to high fecal bacterial levels in commercial shellfish (i.e. molluscs) and possibly other causes continues to increase slightly on both east and west coasts. There was an increase of 18 km^2 closed in Atlantic Canada and 134 km^2 along the Pacific coast in 1988, up 1.2% and 23.5%, respectively, from 1987. The increase in closure area may be

due in part to the increased intensity of surveying by the Shellfish Program in 1988-89, and to administrative closures around municipal outfalls to conform with international program standards. This has resulted in more monitoring and reclassification of aquaculture and wild harvesting sites, for example in Newfoundland (60 reclassifications) and British Columbia (19 more closures), and an enhanced capability to monitor, inventory and map sites.

Broad scale sampling of bivalves on both east and west coasts (e.g. mussels for pesticide residues, trace metals) and tissue analysis for a wide array of toxic chemical residues has been initiated. Results will contribute to the design of a shellfish component of a marine environmental monitoring program for priority toxic chemicals. The program, in order to complement CWS's long-term seabird contaminants program, will require new resourcing.

On the Pacific coast, the discovery of growth abnormalities and mortalities of farmed oysters near a newly established salmon farm has led to the banning by Agriculture Canada of tributyl-tin based marine growth retardants on salmon net pens. The heightened awareness of effects of TBT on the marine environment also led to stricter controls on the use of TBT on boat hulls.

The Shellfish Program, with strengthened resourcing and interdepartmental/ provincial involvement, not only ensures that commercially harvested shellfish are safe for human consumption, but also contributes highly relevant and reliable status and trends data for assessments of marine environmental quality of coastal waters in southern Canada.

Fish

A report on the prevalence of fish liver lesions in Vancouver Harbour has been published (Goyette, 1988), generating considerable media coverage and public concern. Very high percentages of English sole in certain locations have lesions corresponding to high sediment contaminant levels, particularly hydrocarbons, PAHs and trace metals (chromium, lead and zinc). Strong support is present from mayors of municipalities adjacent to the harbour for clean-up of wastewater discharges and development of an overall action plan for the harbour. EP is currently preparing a series of reports on the distribution and biological impacts of benthic contaminants in Vancouver Harbour scheduled to be published in late 1989. The reports will identify impacts from a number of urban and industrial sources requiring remedial action.

Wildlife

The levels and effects of chemical contaminants in marine birds and wildlife are becoming better understood, with studies being conducted on three coasts. The extent of the issue is exemplified with the wide range and high levels of contaminants in Beluga whales of the Saguenay Fjord and St. Lawrence River (Beland, 1988); the dioxins and other contaminants in blue herons off the west coast (Elliott et al., 1989); and the widespread distribution of trace metals and organics in native foods, including polar bears, pinnipeds and cetaceans across the Arctic (Muir et al., 1988).

Contaminant monitoring in Atlantic seabirds continued, with the collection of eggs and tissues (Peakall, pers. comm.). Polychlorinated dibenzodioxins (PCDDs) and dibenzofurans (PCDFs) were identified in fish-eating birds (herons, cormorants) and other biota (fish, crabs, bivalves) in the Strait of Georgia, B.C., as part of the interagency emergency program on the effluents of bleached-kraft pulp mills; the results contributed to the closure of Howe Sound shrimp and prawn fisheries in January 1989.

During the past year, an agreement for a circumpolar survey of contaminants in polar bears was developed, involving Alaska, Greenland, USSR, possibly Norway and Canada.

3.4 HARBOURS

Harbour pollution and its control is a major issue on Atlantic and Pacific coasts.

Concern about the discharge of raw sewage into St. John's Harbour has generated calls from public and municipal politicians for federal and provincial funding for municipal sewage infrastructure and treatment facilities. A recent report on the harbour stated that deterioration of water and sediment quality in the harbour was accelerating faster than anticipated.

The Halifax Harbour Agreement (1988) has led to surveys of water, sediment and biota quality in the harbour, and discussion of the location of one or more treatment plants. A study is being conducted on effects monitoring techniques suitable for both nearshore and offshore sites.

3.5 AQUACULTURE

There are increasing numbers of industry-aquaculture and fisheries-aquaculture conflicts on Atlantic and Pacific coasts that merit attention and resolution. Examples include sewage-mussel, and salmon-oyster conflicts. Attention is being paid to these issues in the enhanced Shellfish Program, through increased monitoring of commercial shellfish growing and culturing areas along the coasts. At the same time, there have been cases of domoic acid contamination in mussels from several locations in the Maritimes, and considerable research is being conducted by NRC, DFO and others to understand the sources and mechanisms of toxic action by contamination.

The issues with aquaculture are of two categories: conflicts between competing uses, and the occurrence of natural toxins in coastal waters that may or may not be caused by, or contributed to, by increased nutrient loading. Resolution of these issues requires an increased number of key activities, such as intensive coastal MEQ monitoring, the continued development of marine guidelines, and coastal zone management programs in areas of multiple uses.

In B.C., the salmon farming industry grew rapidly from 1986 to 1988, adding chemicals such as TBT (since banned, see Section 3.3), antibodies, and growth

hormones to local waters. Salmon farms also introduce heavy organic loadings (faeces and unused food) which may contribute to observed increases in plankton bloom frequency and intensity, with occasional disastrous consequences for the farmed salmon. Similar problems have been of concern in Atlantic Canada, where Atlantic salmon and trout are being raised in coastal pens in the Bay of Fundy.

A further area of conflict in B.C. has been bacterial contamination of oyster leases by salmon farms, with resulting closure of oyster harvesting. A provincial inquiry in 1987 led to improved regulatory control, including limitations of further growth of the industry in certain areas, and further study of the problem.

3.6 PLASTICS

The occurrence of large quantities of persistent plastics along shorelines, and in both nearshore and offshore waters, has become a national MEQ Issue. These materials are a major hazard to fish, turtles, birds and mammals; this has been well documented. They are also an aesthetic nuisance along shorelines.

The problem is being addressed through a federal interdepartmental working group, chaired by DFO and reporting to the Interdepartmental Committee on Oceans. The commercial driftnet fishery and the problems caused by abandoned driftnets are not within the scope of this working group. Their action plan calls for the establishment of a national plastics office with a modest budget to coordinate work on the issue. Initially, the national office will be run by DFO or DOE.

3.7 OCEAN DUMPING

A number of issues are being addressed regarding the continued disposal of dredge spoils and other wastes at sea. These include the presence of PAHs and dioxins in dredged sediments near industrial outfalls; sediment guidelines for specific classes of toxic substances; the biological assessment of contaminated sediments that fall between screening and rejection limits; Canada's position on incineration at sea; and the short and long-term effects of fish offal dumped at sea.

On June 30, 1988, the Ocean Dumping Control Act (ODCA) was incorporated into the Canadian Environmental Protection Act (CEPA), as Part VI, without substantial change. The intent of the ODCA was to implement domestically the provisions of the London Dumping Convention. A recent legal opinion that CEPA Part VI applies to the residue from the sandblasting of oil rigs indicates that Part VI has broader powers than the ODCA. An analysis of various situations that could have adverse impacts on the marine environment, e.g., sandblasting of bridges and vessels, sidecasting, abandonment of artificial islands, is underway to determine the best legal instrument, whether it be the Fisheries Act, Part VI of CEPA, or another piece of legislation, to deal with each case.

A program evaluation of the scientific and monitoring components of the Ocean Dumping Program, completed in March 1989, made 14 recommendations for improvements. An action plan has been developed to address these recommendations as well as a number of other problem areas identified by program managers. Proposed activities include a review and decision on the scope of the ocean dumping provisions of CEPA, i.e. Part VI; amendments to the ocean dumping regulations; establishment of a minimum monitoring program; increased science support to the program; establishment of a departmental ocean dumping research fund; meeting enforcement and compliance obligations under CEPA; development of appropriate protocols and guidance documents; and administering the program through communication and consultation.

3.8 CONTAMINANTS IN NATIVE FOODS

There is widespread chemical contamination of native food species and other biota across the Arctic (Muir et al., 1988; Globe and Mail, Dec. 1988; Hargrave et al., 1989). Of particular concern are the levels of PCBs and other OCs found in fish and mammals, which form a major part of the diet of native people. The contamination is of three sources: aerially borne contamination from Europe, USSR and Asian countries; materials from industrial activities and former DND sites e.g. DEW line sites; and contaminants in the body lipids of migratory birds.

The issue is the degree of health hazard being imposed on native peoples, and the hazard to the natural ecosystem, from these Arctic contaminants. Knowledge of their distribution, likely sources, persistence, fate in the ecosystem and in food webs leading to man, and effects on man and key biota is needed.

This issue will likely be addressed at the upcoming Conference on Land-Based Pollution in the Arctic (see Section 5.7 below).

3.9 MARINE POLLUTION AND HUMAN HEALTH

The linkage(s) between marine contamination and deleterious effects on human health is a major MEQ issue, and an ever-widening threat in selected areas of the coastline. Both natural and anthropogenic substances are involved: natural toxins; sewage; industrial and municipal wastes; PAHs and dioxins in fish tissue. People have died or have had long-term illnesses caused by poisoned mussels (due to the natural toxin, domoic acid). A number of skin, ear and other infections can be transmitted through swimming in sewage contaminated waters.

The recent "discovery" of extensive dioxin contamination near Canadian pulp mills and the resulting closure of fisheries near three mills in B.C. demonstrates the rudimentary nature of our knowledge of Canadian coastal chemical contamination. Although DFO Inspection laboratories will test fish and shellfish for priority contaminants during period of crises, Canada does not yet have an ongoing formal program of monitoring contaminants in fisheries

species, with the objective of safeguarding both human and marine ecosystem health.

3.10 CONSERVATION OF SEABIRDS

Choosing appropriate long-term strategies to ensure conservation of habitat and food for populations of seabirds along Canada's coasts and in offshore waters is a major wildlife issue. To address this, a discussion paper on "Conservation Issues and CWS Priorities for Marine Birds" has been prepared (Gaston, MS 1989).

Under the Migratory Birds Convention Act (1917), the Canadian Wildlife Service is responsible for the conservation and protection of almost all marine birds: loons, grebes, fulmars and shearwaters, storm-petrels, gannets, herons, waterfowl, shorebirds, gulls, terns and auks. Cormorants, and aquatic raptors such as ospreys and bald eagles come under provincial jurisdiction. These birds are directly at risk from legal and illegal hunting, net-drowning, oil pollution, and poisoning by a range of chemicals. The indirect threats include the human destruction or disturbance of breeding and feeding habitats, and competition with the fisheries for prey such as capelin. They also include excessive predation by gulls, whose populations exploit the increasing abundance of garbage.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) lists the following birds breeding in Atlantic Canada in one or other of its categories: Endangered: Piping Plover; the anatum subspecies of the Peregrine and Falcon; the Eskimo Curlew. Threatened: Roseate Tern. Rare: Caspian Tern: Ipswich Sparrow; The Ivory Gull.

Of these, the Piping Plovers are endangered by all-terrain vehicles and other recreational use of beaches where they breed. The anatum peregrines were virtually wipe out by accumulations of pesticide residues in the 1950's and are only now recovering - assisted by reintroduction products sponsored by CWS. The small Roseate Tern population is seriously threatened by gull predation, compounded by human disturbance of their colonies. Caspian Terns breed mainly in the Great Lakes/St. Lawrence; Atlantic Canada is at the extreme eastern edge of their range. The Ipswich Sparrow is a well-marked subspecies of Savannah Sparrow, virtually confined to Sable Island. The Ivory Gull's status probably reflects the distribution of winter pack-ice, its preferred habitat, as much as a scarcity of birds.

Regular population monitoring and management are required for our breeding populations of Common Eiders, Harlequin Ducks, Common and Roseate Terns, Razorbills, Thick-billed Murres and Atlantic Puffins. The urgent need with the murres is a legal framework for regulating the Newfoundland 'turr hunt'. Manx Shearwaters, Leach's Storm-Petrels, Northern Gannets and Harlequin Ducks should be monitored, although no further action seems necessary now.

4. NATIONAL INITIATIVES

4.1 MONITORING

Source and ambient monitoring has been continued in relation to industrial effluents (e.g. pulp mills), specific toxic chemicals (e.g. organochlorines), regulatory responsibilities (e.g. Nestucca and Placentia Bay oil spills). Applied research has continued on the design and techniques for biological effects monitoring, both inshore and offshore.

Activities have increased in the shellfish program, in relation to the water/sediment quality of harbours (Halifax, Vancouver), and at accident sites (oil spills). There has been considerable interdepartmental cooperation to determine the presence and distribution of trace contaminants across the Arctic, especially in wildlife and fish. The seabird contaminants monitoring program has continued, providing status and trends data for almost twenty years in coastal waters (Noble and Elliot, 1986). Considerable work has gone into the design considerations for an offshore, petroleum-related effects monitoring program, especially for the Grand Banks (Lane et al., 1989).

At this time, there is a need for a more complete knowledge (inventory) of the marine environmental monitoring programs being conducted in Canada, a mechanism for information exchange and program coordination, and an enhancement of programs of contaminant monitoring in coastal waters and estuaries.

4.2 MARINE WATER QUALITY GUIDELINES AND OBJECTIVES

The Water Quality Branch of IWD has started the development of environmental quality guidelines for the protection of marine resources. The available marine criteria, guidelines, objectives and standards for coastal and estuarine waters, sediments and biota from various jurisdictions in the world are currently being compiled and reviewed. In addition, a report on the guiding principles for the development and use of Canadian MEQ guidelines will be included. A draft of this document will be available by mid-1990.

Development of MEQ guidelines has been initiated for specific priority substances in selected marine compartments. A draft report with interim guidelines for PCBs in marine waters was produced and is presently being reviewed by the CCME Task Force on Water Quality Guidelines and federal experts. An exercise was completed for deriving guidelines for PCBs in marine sediments, but guidelines were not developed at this time due to the paucity of relevant scientific information.

Environmental quality guidelines for organotin compounds in fresh and marine waters are in the final stages of preparation. The first draft will be submitted for external review in early 1990.

The development of other MEQ guidelines in water and sediments will be considered on a parameter-specific basis. The priority of the substance and its associated environmental compartment will be determined by the CEPA Priority Substances List, the CCME Task Force and federal working groups.

4.3 MARINE SOE REPORTING

Contributions of the SOE Reporting Branch, CPG, to reports on MEQ are described below.

A second draft of the marine chapter of the 1991 OECD State of the Environment Report was completed and submitted to OECD. The SOE Branch of the department is fully responsible for this chapter.

The two marine chapters (Fisheries, Oceans and Coastlines) of the National State of the Environment Report were discussed, outlined and are under development with DFO (Ottawa). The MEQAG has been providing data and reports to DFO writers for this project.

The SOE Report "Pollutants in British Columbia's Marine Environment: A Status Report" (Kay, 1989) was translated and completed. This report and an accompanying Fact Sheet will be released in late October, 1989. The report shows that while the status of the condition of B.C.'s coastal waters can be assessed, trends in environmental quality cannot be, due to the absence of sufficient long-term data.

In conjunction with the Marine Biology Group (PYR), a methodology for presenting and interpreting data on levels of selected marine contaminants was developed through a pilot project (Waters, 1988).

A database survey was initiated through DOE and DFO to identify data useful for SOE reports. The results for C&P headquarters are now available in a report (McRae, 1989). A second volume identifying data bases in DOE regions and other services will be developed.

The MEQ Advisory Group is completing the 2nd Draft MEQ Status and Priorities Report, for technical review, and, leading from this report, working with the SOE Branch on a framework for the overall assessment of MEQ, and identifying suitable indicators of the state of Canada's marine environment.

4.4 REGIONAL MARINE MANAGEMENT PLANS AND PROGRAMS

Conservation and Protection continues to be active in the Fraser River Estuary Management Program (FREMP). EP is on the Water Quality Plan Standing Committee of FREMP and working on a number of programs, such as area-use designations and emergency responses. Two projects were completed with PYR (EP) and HQ funding: effects of jet fuel on marsh vegetation, and the usefulness of marsh plants as a biomonitoring tool. Renewal of the federal-provincial agreement on FREMP, emphasizing implementation and action, is under discussion.

CWS (PYR) was involved in a number of programs dealing with estuarine habitats on the B.C. coast. The Cowichan Estuary Pilot Project examined the current and proposed uses of the estuary, while another project studied Snow Goose habitat use and impact in the Fraser and Skagit estuaries. Input was provided to land-use planning schemes such as the Fraser, Squamish and Cowichan River estuary management plans, interagency land use referrals, and EARP panel projects. Habitat rehabilitation monitoring continued for Campbell, Cowichan and Englishman River estuaries. Habitat management was encouraged through participation in the federal-provincial Pacific Estuary Advisory Team, a subgroup of the Pacific Estuary Conservation Program.

For the Arctic, CWS (WNR)'s marine bird activities included continued public consultations for establishment of the proposed coastal and island Migratory Bird Sanctuaries at Prince Leopold Island, Cape Searle and Reid Bay.

Quebec Region of Conservation and Protection is fully involved in the start-up of the St. Lawrence River Action Plan, which should contribute to improvements of water, sediment, biota and habitat quality in heavily impacted estuarine parts of the river. CWS (Quebec) conducted inventories of marine birds in the migratory Bird Sanctuaries of the north coast of Quebec, including Mingan National Park Reserve, and conducted enforcement activities at the Sanctuaries during the Spring.

In the Atlantic Region, the Fundy/Gulf of Maine/Georges Bank (FMG) Pilot Project on Integrated Information Systems is underway, focusing on the international waters of the Gulf of Maine. The projects's objective is to create interfaces between a large number of relevant environmental data bases, and allow access to the data through computerized base maps of the region. The project is co-sponsored by the federal and provincial governments, and industry, and is being conducted through St. Mary's University, Dalhousie University and the Land Registration and Information Service of the Nova Scotia Government.

An EP Atlantic Region Marine Remedial Action Plan Program has also been outlined in the Atlantic Region, with an emphasis on assessments, controls and monitoring of selected coastal areas, especially industrialized harbours and inlets (See Environment Canada, 1989d).

CWS management activities included enforcement during the murre/eider hunt in Labrador and Newfoundland; special protection to several estuarine habitats, including Malpeque Bay, PEI, a new RAMSAR site; and various migratory bird projects (aerial surveys, banding, inventories of colonies, etc.).The murre/eider hunt continues to be a major stress to their populations, and regulation is limited solely to proving illegal sale of hunted murres. The joint strategies of public education and assigning "game-bird" status to the birds are being vigorously pursued to enable really effective regulation of the hunt.

The Atlantic Region Estuary Program has been developed, through appropriate consultation and workshops. PEI and C&P (Atlantic) are moving ahead with the Wilmot-Dunk Demonstration Watershed Project under this program, as well as

five other projects under the three-year Canada-PEI Water Resources Management Agreement (Environment Canada, 1989e) - West River, North River, Estuarine Sedimentation, South Malpeque Bay, and Estuarine Water Quality.

4.5 RESEARCH AND DEVELOPMENT

EP (Newfoundland) participated in the MEQ subgroup of Memorial University of Newfoundland's Ocean Studies Task Force. The Task Force is reviewing programs and research needs related to the ecology of the North Atlantic Ocean and ocean industries to better prepare its graduates for jobs.

EP, through the Intergovernmental Aquatic Toxicity Group, is continuing the development of suites of standardized toxicity tests for regulatory and monitoring uses. These are being applied to effluents entering the sea and contaminated marine sediments.

CWS marine wildlife research included research and inventories of seabird and shorebird colonies, studies of migratory bird habitat use, polar bear research, and studies into the levels and effects of chemical contaminants in marine birds and mammals. The research is conducted in support of the Migratory Birds Convention Act, the International Agreement on Polar Bear Conservation, and the RAMSAR Convention.

Some examples of CWS research follow. In the Arctic, studies continued on polar bear age and sex specific mortality of subadults, fidelity to maternity denning habitat, interspecific relationships, and use of polynya habitat. Research was conducted on the bioenergetics and migration of high Arctic avian migrants, breeding shorebirds in Foxe basin, and shorebird distribution. A Thick-Billed Murre population dynamics study was completed at Coats Island, Hudson Bay. The murre colony at Cape Graham Moore was visited for the first time in 1989, and monitoring checks were made on several other Arctic and Atlantic colonies. Studies of the pelagic ecology of seabirds on Georges Bank have begun. On the West Coast, contaminant studies continue on the blue heron, and ecological studies continue on Ancient Murrelets and Cassins Auklets in the Queen Charlotte Islands and Hecate Strait, respectively. Many contaminant studies are underway at the National Wildlife Research Centre, including contaminant monitoring in bird tissues, and contributions to a circumpolar survey of contaminants in polar bears.

A section on some MEQ research priorities has prepared (MEQAG MS 1989), covering most of the major issues. Research and Development priorities have been described in the MEQ Action Plan (July 1989).

4.6 COMMUNICATIONS

Many scientific, technical, public and policy papers, documents and fact sheets have been produced over the past two years, and posters on MEQ have been presented at Conferences e.g. Quebec City Toxic Chemicals in Rivers and Estuaries Conference, and many talks have been given to bodies such as

universities, marine laboratories, other government departments and ocean study task forces.

4.7 CONFERENCES AND WORKSHOPS

The Canadian Conference on Marine Environmental Quality was held February 29 - March 2, 1988, in Halifax, N.S., sponsored by 8 groups. The overall theme was "to explore the Marine Environmental Quality issue and work towards a framework to prevent and resolve marine environmental protection problems in Canada". Sixty-seven participants came from five countries. Three workshops at the Conference enabled participants to discuss the issue and identify elements of a Canadian MEPF (Marine Environmental Protection Framework) for controlling and preventing pollution, especially land-based, on our three coasts. The Workshop summaries and the Conclusions and Recommendations of the Conference, in the published Proceedings (Wells and Gratwick 1988), form the basis for continued work on a Canadian MEQ Framework. This work is underway in 1989 under the MEQ Subcommittee of the Interdepartmental Committee on Oceans (Fisheries and Oceans 1988), co-chaired by DOE and DFO.

A Workshop was held in March 1988 in St. John's, Newfoundland, on Point Source Effects Monitoring for the Marine Environment, attended by industry, university and government. The Proceedings (Environment Canada, 1988d) will be used to assist industry and government to develop practical, cost-effective EEM programs in the oil exploration/production areas in the offshore environment.

An Arctic MEQ Workshop was held in Yellowknife, June 1988, organized by Environment Canada and attended by a number of agencies (federal, territorial). The Proceedings (Environment Canada, 1989b) described a number of MEQ priorities for the Arctic.

The CWS jointly sponsored an international conference on the St. Lawrence beluga population. The conference, held in September 1988 with 280 participants, provided a means for group study of the beluga, and attempted to identify actions to contribute to their survival. A Proceedings is in preparation.

EP and CWS hosted a Workshop "Mitigation of Effects of Oil Pollution on Seabird Populations: Prevention and Prosecution in Newfoundland and Labrador Waters", on November 7-8, 1988. Participants were from seven federal and provincial agencies. Principal topics addressed were the causes of oil pollution and its effects on seabirds; the strengths and limitations of existing and proposed legislation; the agencies and procedures involved in reporting and responding to oil spills; and the collection, analysis and presentation of evidence for prosecutions. A proceedings has been published (Environment Canada, 1988c). The Workshop was successful in identifying key issues and action items for government attention.

The AMOP (Arctic and Marine Oilspill Program) Technical Seminars have continued successfully for the past two years, presenting state-of-the-art

technical information on the fate and effects of oil spills, and the technologies available for their control, cleanup and prevention (Environment Canada 1988e, 1989c).

In May 1989, Environment Canada, in cooperation with several other federal departments, sponsored a workshop on marine plastic debris and abandoned driftnets. About sixty representatives from various levels of government, the plastics and recycling industries, the shipping industry, fishermen's unions, recreational associations and environmental groups attended. The workshop grappled with needs in the areas of research, public information/education, technology development, on-board waste management, shore-based reception facilities, and legislation/enforcement. Recommendations from the workshop formed the basis of an action plan to deal with the Canadian marine plastics problem.

Collectively, these meetings are highlighting the issues and providing an agenda of key priorities for action.

5. INTERNATIONAL ACTIVITIES

There is a major international component to MEQ activities in the Department, due to the large number of obligations and commitments Canada has under various Conventions, Agreements, Treaties and Guidelines with other countries. There is also a strong commitment in principle to protecting, conserving and maintaining the sustainability of the "global marine commons", as supported by the Bruntland Commission (World Commission on Environment and Development, 1987); to marine environmental and ecological research; and to international cooperation addressing, assessing and resolving major marine problems. The international activities described below are only a small selection of those occurring within C&P representing activities of members of the MEQ Advisory Group.

5.1 NATIONAL RESEARCH COUNCIL (WASHINGTON) MARINE BOARD

Work on the Committee of Effectiveness of Oil Spill Dispersants was completed in 1988. The committee's review - "Using Oil Spill Dispersants on the Sea" - which took three years to prepare, was published in February 1989 (NRC, 1989).

Lee Harding (PYR) contributed a background pulp and paper mill monitoring report to the Committee on Systems Assessment of Marine Environmental Monitoring, whose work is in progress.

5.2 GESAMP

Canada is represented on GESAMP (U.N. Joint Group of Experts on Scientific Aspects of Marine Pollution) by M. Bewers (DFO) and P.G. Wells (DOE). Wells has been active on Working Group 1 (Hazard Assessment of Chemicals Carried by Ships, Working Group 13 (Other Chemicals - Oil), Working Group 27 (Long-Term Ecological Effects of Low-Level Chemical Contamination in the Sea), and Working Group 28 (Strategies for Marine Environmental Protection). GESAMP advises U.N. agencies and groups charged with legislation (London Dumping Convention, MARPOL, etc.) on technical and scientific issues dealing with marine pollutants, and conducts reviews and assessments of current problems, and approaches for their resolution.

5.3 EXXON VALDEZ OIL SPILL

The Exxon Valdez went aground in Prince William Sound in March 1989, producing the USA's largest oil spill to date. A number of DOE engineers and scientists have contributed advice, technical expertise and equipment to assist in the emergency response and cleanup. M. Fingas (River Road Laboratory) visited the spill site and advised on dispersant use.

5.4 LONDON DUMPING CONVENTION AND MARPOL

Environment Canada (G. Cornwall, EP, HQ) leads the Canadian Delegation to the Consultative Meetings of the London Dumping Convention with support from R. Boulden (EP, HQ). Fisheries and Oceans (J. M. Bewers) and External Affairs complete the delegation. Contentious topics in recent years have been the at-sea disposal of low level radioactive wastes (currently there is a moratorium on this practice), the incineration at sea of noxious liquid wastes (some Contracting Parties are currently pushing for a ban) and a proposal for re-structuring the Annexes to the Convention.

Environment Canada also provides support to Transport Canada for meetings of the Marine Environment Protection Committee where the MARPOL Convention and its annexes are discussed. Transport Canada recently amended the Canada Shipping Act to allow Canada to accede to MARPOL and to its compulsory annexes, Annex I on the prevention of pollution by oil, and Annex II on the control of pollution by noxious liquid substances in bulk. Canada does not intend to accede to Annex V on the prevention of pollution by garbage from ships.

5.5 SEAPOL

E. Norrena (EP, Dartmouth) attended a SEAPOL Workshop in Bangkok, Thailand, in May 1989, dealing with the application of the 1985 UNEP Montreal Guidelines on Protection of the Marine Environment Against Pollution from Land-based Sources, to marine pollution problems in the Gulf of Thailand. A paper was presented (Norrena and Wells 1989), and workshop discussions were led on marine environmental protection strategies suitable for the Gulf region.

5.6 ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD)

Conservation and Protection is involved in two initiatives. The SOE Branch is leading the preparation of the Marine Chapter for the next OECD State of the Environment Report. C&P (Atlantic) is contributing to a Coastal Zone Management initiative; J. Vollmershausen presented a paper on Canada and CZM in February 1989 in Paris (J. Vollmershausen et al., 1989).

5.7 ARCTIC LAND-BASED POLLUTION

Environment Canada, through CPG and C&P, is contributing to Canada's input to a Finnish initiative to hold a Conference on Land-Based Pollution in the Arctic, leading to a Convention for the Control of Land-Based Pollution in the Arctic. The MEQAG has contributed background material dealing with MEQ in the Arctic to CPG.

5.8 MARINE WILDLIFE

Through the CWS Latin American Program, an "Atlas of Shorebird Distribution on the Coast of South America" was published, and aerial surveys in Panama identified wintering habitat of international importance for Western Sandpipers. Two new programs were initiated: one is examining the degradation of coastal Mexican habitat used by migratory birds from Canada, and the second is lending aid to Brazil for assessing the impact of hydroelectric dams on aquatic communities.

Other CWS international activities include the agreement reached in the past year for a circumpolar survey of contaminants in Polar Bears.

6. THE NEXT STEPS - THE MEQ ACTION PLAN

The MEQ Advisory Group has prepared a Five-Year Action Plan identifying new initiatives on the Marine Environmental Quality Issue for Conservation and Protection (MEQAG, MS 1989b). The plan follows from the MEQ Management Framework, knowledge of urgent marine issues, associated departmental initiatives, and needs recommended by the 1988 MEQ Conference in Halifax.

New actions fall into seven areas: Monitoring, Guidelines, SOE Reporting, Coastal Management Plans, Communications and Public Awareness, Marine Environmental Research and Development, and Compliance and Enforcement.

Specific activities are well described in the Action Plan. The primary achievements of this plan would be:

. a National MEQ Status and Trends Monitoring Program;

. MEQ Guidelines and Objectives for selected CEPA priority toxic chemicals, for marine waters and sediments;

. periodic marine SOE reports and assessments;

. environmental management programs for selected coastal areas;

. an effective communications and public awareness program on marine environmental issues and solutions;

. an enhanced research program on the fate and effects of estuarine and coastal environmental contaminants; and

. vigorous enforcement of DOE's marine legislation and regulations, especially Part VI of CEPA, Section 36 of the Fisheries Act, and Acts pertaining to marine wildlife and their habitats.

This Action Plan was approved in principle in September 1989 and awaits resourcing and implementation.

7. SUMMARY

This report, covering a two year period, illustrates the wide range of responsibilities, issues, initiatives and international activities that Conservation and Protection is involved with for protecting and conserving Canada's seas.

The report attempts to highlight some of the MEQ activities and contributions of C&P. It emphasizes some of the more important issues and threats facing our estuarine, coastal and offshore waters, and some of the efforts of our programs being brought to bear to minimize threats and protect marine areas and ecosystems.

Most importantly, the report covers the MEQ issue/initiative in C&P comprehensively, for the first time linking many of the valuable but often disparate programs and achievements. The department has many marine roles and responsibilities, and this fact alone deserves recognition and support when setting environmental priorities, agendas and long-term plans. The international responsibilities and concerns also emphasize that we need a strong and focused perception of our marine programs, their linkages,and their overall contribution to maintaining both Canadian and global marine environmental quality.

The MEQ Action Plan, approved in principle in September 1989, identifies key areas where we urgently need to improve and augment marine environmental programs in Canada. Implementation of this Plan will be a major step towards improving our capacity to prevent and reduce marine pollution, protect wildlife and its habitats, restore damaged ecosystems,and meet national and international goals of looking after "the global marine commons". Future Annual Reports on the MEQ issue will address our progress towards meeting these crucial goals.

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